

What is claimed is:

1. A central processing unit executing a program, comprising
5 an encrypting unit encrypting a block, and decrypting an encrypted block, wherein:
a first private key is concealed in secrecy; and
said encrypting unit obtains from a first license a code decryption key for decrypting an encrypted block
10 which configures a first program by decrypting with the first private key the first license of the first program, which is encrypted with a public key pairing with the first private key.
- 15 2. The central processing unit according to claim 1, further comprising
a cache, wherein
said encrypting unit decrypts the encrypted block in units of cache when the encrypted block which
20 configures the first program is output from a memory region to said cache.
3. The central processing unit according to claim 1, further comprising
25 a tamper resistant buffer that a user cannot

reference or falsify, wherein

the code decryption key is recorded to said tamper resistant buffer.

5 4. The central processing unit according to claim 3, wherein:

the first license includes an access condition used when an execution process of the first program accesses a memory region;

10 a TLB (Translation Lookaside Buffer) recording an address of the memory region, at which the encrypted block which configures the first program is recorded, and the access condition to the memory region,

a memory managing unit,

15 a cache, and

a processor core are further comprised;

said TLB and said tamper resistant buffer are linked;

said memory managing unit obtains the access
20 condition to the memory region from said TLB based on an address of a memory region, at which an encrypted block is recorded, and further obtains the code decryption key corresponding to the memory region from said tamper resistant buffer;

25 said processor core determines whether or not an

access to the memory region is permitted to be made from the execution process based on the access condition obtained by said memory managing unit, and the access to the memory region is made from the execution process
5 if said processor core determines that the access to the memory region is permitted to be made; and

said encrypting unit writes to said cache a code obtained by decrypting the encrypted block within the memory region with the code decryption key obtained by
10 said memory managing unit.

5. The central processing unit according to claim 4, wherein

the code decryption key and the encryption key
15 used to encrypt the encrypted block are a same key.

6. The central processing unit according to claim 4, wherein

when a memory region accessed from the execution
20 process of the first program switches from a first memory region to a second memory region, said memory managing unit further determines whether or not a code decryption key corresponding to the first memory region, which is obtained from said tamper resistant buffer, and a code
25 decryption key corresponding to the second memory region

match, and an access is made to the second memory region from the execution process if said memory managing unit determines that the code decryption keys match, or the access to the second memory region is not made from the
5 execution process if said memory managing unit determines that the code decryption keys mismatch.

7. The central processing unit according to claim 1, wherein
10 the first license is buried in the first program.

8. The central processing unit according to claim 4, wherein:
a different data encryption key is recorded to
15 said tamper resistant buffer for each code decryption key;

said encrypting unit records data within said cache to the memory region that is corresponded to the data decryption key by said TLB after encrypting the
20 data with the data decryption key when recording the data to the memory region, and writes encrypted data within the memory region to said cache after decrypting the read data with the data encryption key when reading the encrypted data within the memory region.

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9. The central processing unit according to claim 8, wherein

when data obtained by executing a first code is used by a second code, said processor core sets said
5 TLB so as to provide the second code with an access right to a memory region to which the data is recorded, and also sets said TLB and said tamper resistant buffer so that the second code uses a data encryption key for encrypting the data when reading the data from the memory
10 region.

10. The central processing unit according to claim 4, further comprising:

a register; and
15 a register access control table for performing access control for said register, wherein
said processor core controls sealing and release of said register with a sealing flag within said register access control table.

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11. The central processing unit according to claim 4, wherein

when contents of said TLB is recorded to a page table within an external storage device, said encrypting
25 unit affixes a signature to the contents to be recorded,

and verifies whether or not the signature is legal when contents of the page table is captured into said TLB.

12. The central processing unit according to
5 claim 3, wherein

when contents of said tamper resistant buffer is recorded to an encryption key table within an external storage device, said encrypting unit encrypts the contents to be recorded.

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13. The central processing unit according to claim 1, which is connected to a different central processing unit, wherein:

a session key is obtained by making mutual
15 authentication with the different central processing unit; and

said encrypting unit encrypts contents of said cache with the session key, and synchronously transfers the contents to the different central processing unit.

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14. The central processing unit according to claim 1, wherein

said encrypting unit obtains a private key encryption key used when a second private key is
25 encrypted by decrypting a second license added to a

second program with a public key before the first program is executed, and decrypts the second private key with the obtained private key encryption key.

5 15. The central processing unit according to claim 14, wherein:

 an access condition indicating that only a read can be made from an execution process of the first program is added to the second license; and

10 the second private key can be read only from the execution process of the first program.

 16. The central processing unit according to claim 14, wherein

15 the second private key is encrypted with a data encryption key and recorded to a memory region.

 17. The central processing unit according to claim 3, wherein:

20 said tamper resistant buffer records
unable-to-output information indicating whether or not
to output corresponding information within said tamper
resistant buffer to an outside of said tamper resistant
buffer, and cache lock information indicating whether
25 or not to output corresponding information to an outside

of said cache; and

a move of the first license between the first program and a different program is managed based on the unable-to-output information and the cache lock
5 information.

18. The central processing unit according to claim 1, wherein

the first program is a trusted computing module.
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19. The central processing unit according to claim 1, wherein

the first program is a program for causing the central processing unit to implement an electronic
15 wallet.

20. The central processing unit according to claim 1, wherein

the first program is a program handling personal
20 information.

21. The central processing unit according to claim 1, wherein

the first program is a virus check program of a
25 code installed in the central processing unit.

22. The central processing unit according to claim 1, wherein

the first program is a mobile agent that moves
5 among a plurality of central processing units.

23. The central processing unit according to claim 1, wherein:

the block which configures the first program
10 includes hash verification requirement/nonrequirement
information indicating whether or not verification of
a hash value of the block is required; and

a hash unit calculating the hash value of the block,
and adding the hash value to the block based on the hash
15 verification requirement/nonrequirement information,
and

a hash verifying unit verifying the hash value of
the block based on the hash verification
requirement/nonrequirement information are further
20 comprised.

24. The central processing unit according to claim 1, wherein:

the block which configures the first program
25 includes encryption requirement/nonrequirement

information indicating whether or not the block requires protection; and

5 a protection block selecting unit determining whether the block is output either to said encrypting unit or to said cache or a memory region unchanged based on the encryption requirement/nonrequirement information is further comprised.

25. The central processing unit according to
10 claim 1, wherein:

 a header of an executable file of the first program includes an encrypted block bitmap indicating a configuration of the block which configures the first program; and

15 a protection block selecting unit determining whether the block is output either to said encrypting unit or to a cache or a memory region unchanged based on the encrypted block bitmap is further comprised.

20 26. The central processing unit according to claim 1, wherein:

 a start of a code of the first program is a code which specifies that a plurality of blocks configuring the first program are a repetition of a combination of
25 a plain text block and an encrypted block, and also

specifies a number of successive plain text blocks, and
a number of successive encrypted blocks in the
combination; and

said processor core determines whether the block
5 is output either to said encrypting unit or to said cache
or a memory region unchanged by executing the code.

27. The central processing unit according to
claim 2, further comprising
10 between said cache and a memory
a cache line via said encrypting unit, and
a cache line not via said encrypting unit.

28. A computer comprising a central processing
15 unit which comprises an encrypting unit encrypting a
block, and decrypting an encrypted block, wherein:
a first private key is concealed in the central
processing unit in secrecy; and

said encrypting unit obtains from a first license
20 a code decryption key for decrypting an encrypted block
which configures a first program by decrypting with the
first private key the first license of the first program,
which is encrypted with a public key pairing with the
first private key.

29. An IC card comprising the central processing unit which comprises an encrypting unit encrypting a block, and decrypting an encrypted block, wherein:

5 a first private key is concealed in the central processing unit in secrecy; and

 said encrypting unit obtains from a first license a code decryption key for decrypting an encrypted block which configures a first program by decrypting with the
10 first private key the first license of the first program, which is encrypted with a public key pairing with the first private key.

30. The IC card according to claim 29, wherein
15 the first program is a program for implementing a security function of the IC card.

31. The central processing unit according to claim 1, which is mounted in a robot, wherein
20 the first program is a control program for controlling the robot.

32. A recording device in which is recorded a program for causing a central processing unit to execute
25 a process of a control for giving authorization to

execute a protection program, wherein, the protection program to be encrypted with a code encryption key, and a license, which includes the code encryption key and is encrypted with a public key pairing with a private
5 key comprised in secrecy within the central processing unit, is provided in correspondence with the protection program, the process comprising:

entering the license into the central processing unit before the central processing unit executes the
10 protection program;

causing an encrypting unit comprised by the central processing unit to obtain the code encryption key from the license by decrypting the license with the private key; and

15 causing the encrypting unit to decrypt the protection program with the code encryption key.

33. A program execution authorization method giving authorization to execute a protection program
20 to a central processing unit, wherein, the protection code program is encrypted with a code encryption key, and a license, which includes the code encryption key and is encrypted with a public key pairing with a private key comprised within the central processing unit, is
25 provided in correspondence with the protection program,

comprising:

causing the central processing unit to obtain the license before executing the protection program;

causing the central processing unit to obtain the
5 code encryption key from the license by decrypting the license with the private key; and

causing the central processing unit to decrypt the protection program with the code encryption key.

10 34. A computer-readable storage medium on which is recorded a program code executed by a computer, wherein:

the program code is encrypted with a code encryption key;

15 a license, which includes the code encryption key and is encrypted with a public key paring with a private key comprised in secrecy within a central processing unit comprised by the computer to execute the program code, is provided in correspondence with the program
20 code;

the license is entered into the central processing unit before the program code is executed;

the license is decrypted with the private key by the central processing unit; and

25 the program code is decrypted with the code

encryption key obtained from the license by the central processing unit.

35. A program generating device generating a
5 program executed by a computer having a private key
concealed in secrecy, and an encrypting unit performing
encryption and decryption, comprising:
an inputting unit inputting a code object,
a linker preprocessing unit dividing the input
10 code object into a plurality of blocks, and adding an
NOP instruction to each of the plurality of blocks,
a linker unit making an address resolution,
a protection code executable format generating
unit generating a protection code executable format by
15 encrypting each of the plurality of blocks with a code
encryption key, and
a license generating unit generating a license
that includes the code encryption key and is encrypted
with a public key pairing with the private key, wherein:
20 the license is entered into the central processing
unit before the computer executes the protection code
executable format, and decrypted with the private key
by the encrypting unit; and
the protection code executable format is
25 decrypted with the code encryption key obtained from

the license by the encrypting unit.

36. A central processing unit executing a program, comprising

5 encrypting means for encrypting a block, and
decrypting an encrypted block, wherein:

 a first private key is concealed in secrecy; and

 said encrypting means obtains from a first license
a code decryption key for decrypting an encrypted block
10 which configures a first program by decrypting with the
first private key the first license of the first program,
which is encrypted with a public key pairing with the
first private key.

15 37. A program product having a program for
causing a central processing unit to execute a process
of a control for authorization to execute a protection
program, wherein, the protection program to be encrypted
with a code encryption key, and a license, which includes
20 the code encryption key and is encrypted with a public
key pairing with a private key comprised in secrecy
within the central processing unit, is provided in
correspondence with the protection program, the process
comprising:

25 entering the license into the central processing

unit before the central processing unit executes the protection program;

causing an encrypting unit comprised by the central processing unit to obtain the code encryption
5 key from the license by decrypting the license with the private key; and
causing the encrypting unit to decrypt the protection program with the code encryption key.

10 38. A program product having a program code executed by a computer, wherein:

the program code is encrypted with a code encryption key;

a license, which includes the code encryption key
15 and is encrypted with a public key paring with a private key comprised in secrecy within a central processing unit comprised by the computer to execute the program code, is provided in correspondence with the program code;

20 the license is entered into the central processing unit before the program code is executed;

the license is decrypted with the private key by the central processing unit; and

the program code is decrypted with the code
25 encryption key obtained from the license by the central

processing unit.